FAA Aviation News

SAFETY FIRST FOR GENERAL AVIATION

March/April 2009

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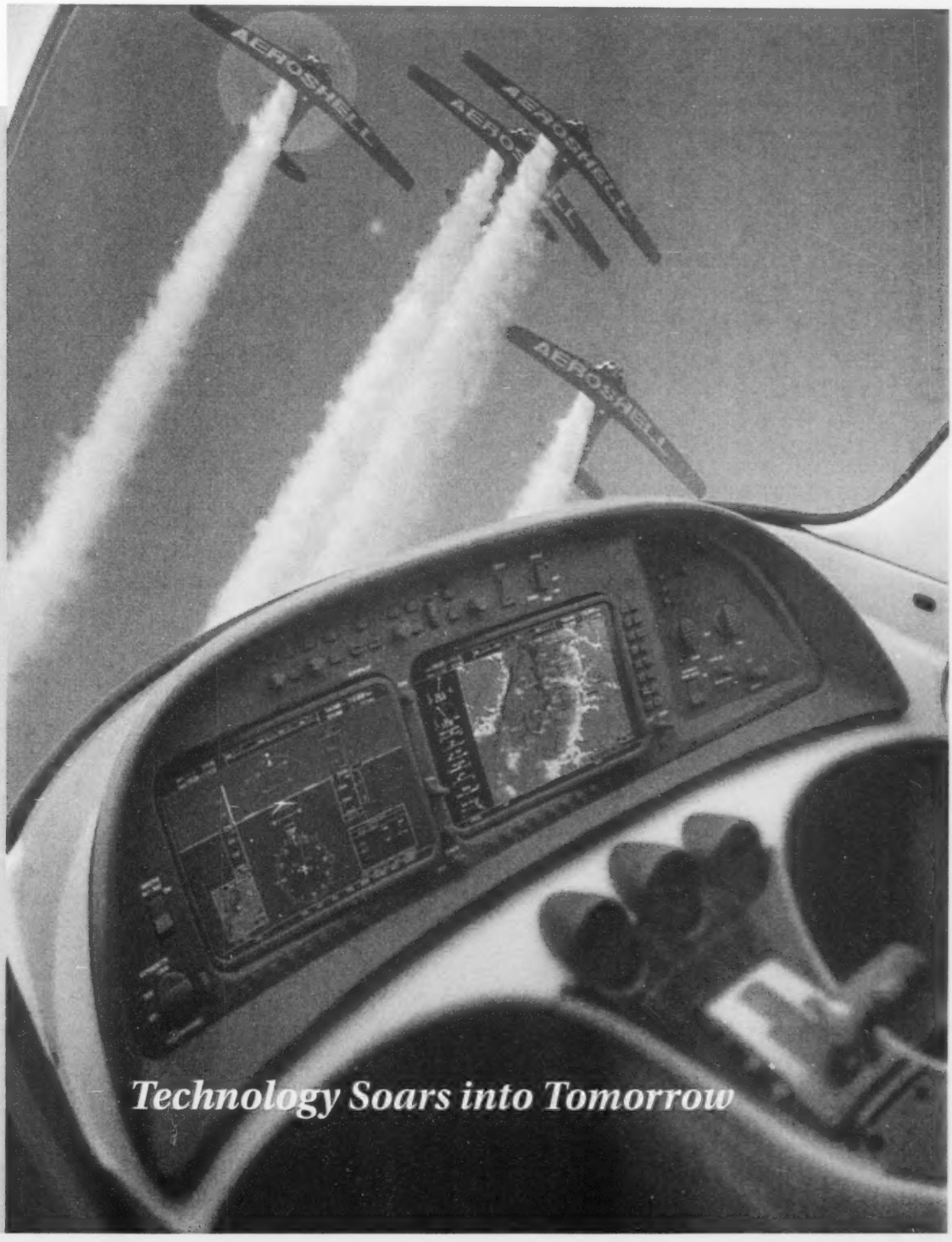
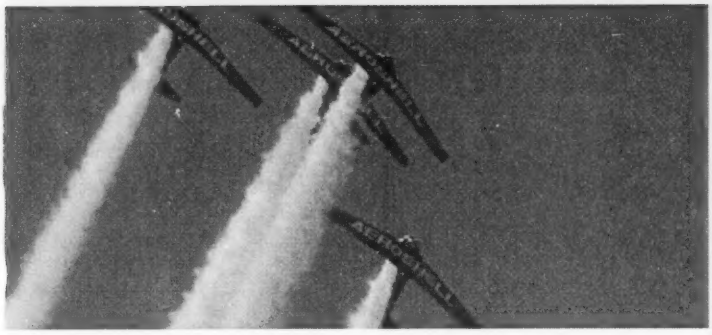


Technology Soars into Tomorrow



In this issue, we highlight advances in aviation technology that could bring about a host of safety benefits to old and new aircraft alike.
Cover: Cockpit photo courtesy of Cessna and aircraft photo by H. Dean Chamberlain

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Raymond H. LaHood *Secretary of Transportation*
Lynne A. Osmus *Acting Administrator*
Margaret Gilligan *Associate Administrator for Aviation Safety*
John M. Allen *Director, Flight Standards Service*
Anne Graham *Acting Manager, General Aviation and Commercial Division*
Susan Parson *Editor*
Lynn McCloud *Managing Editor*
Louise Oertly *Associate Editor*
Tom Hoffmann *Associate Editor*
James R. Williams *Assistant Editor*
John Mitrione *Art Director*

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Comments or questions should be directed to the staff by:

- E-mailing: AviationNews@faa.gov
- Writing: Editor, *FAA Aviation News*, Federal Aviation Administration, AFS-805, 800 Independence Avenue, SW, Washington, DC 20591
- Calling: (202) 267-8212
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JAMES J. BALLOUGH
FORMER DIRECTOR, FLIGHT STANDARDS SERVICE

Jumpseat

It's Been a Fabulous Ride

Take a bucket and fill it with water
Put your hand in it up to the wrist
Pull it out and the hole that's remaining
Is a measure of how you will be missed.

These lines are from the poem "There Is No Indispensable Man." As I hand over the reins of FAA's Flight Standards Service to John Allen, I keep thinking of these lines. Indeed, no one is indispensable and this poem is a humbling reminder. I am also reminded of the remarkable people at FAA and across the aviation community who are so dedicated to aviation safety. Your commitment and your professionalism are indispensable. Thanks to the commitment of FAA's highly technical and professional safety workforce and the commitment of people across the general aviation community, we are enjoying the safest period in general aviation.

Together, we have made major strides. Over each of the past several years, we have seen a stronger general aviation record. In 2007, for example, general aviation fatalities dropped 30 percent from the number in 2006. We have worked across the community with our colleagues at a host of professional organizations. We moved more surely toward practicing risk management. Together, we have picked the important problems—the ones that pose the greatest risk—and we have worked together to fix them.

We made great progress in several targeted areas. We launched the FAA Safety Team to develop highly focused programs to improve safety. We've worked across the general aviation community through the General Aviation Joint Steering Committee to develop safety interventions for personal and light sport aircraft as well as for turbine aircraft. We have dedicated ourselves to addressing the challenges of advanced avionics and technologically advanced aircraft as well as to tackling the safety issues of amateur-built aircraft. And, we are seeing more evidence of a safety culture across the general aviation spectrum. More and more airmen understand the importance of continuing education and are taking advantage of additional training opportunities.

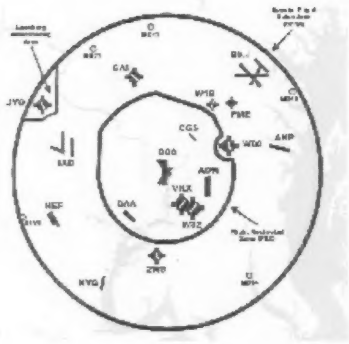
I've only had the pleasure of appearing in these pages since we started this column last March, but I have had the privilege of working for the FAA since 1986 when I started in Pittsburgh, Pennsylvania, as an avionics inspector. My first exposure to general aviation came in 1988 at the Allegheny Flight Standards District Office, then later, to be sure, in my executive positions at the FAA.

I have greatly enjoyed the opportunities I have had to interact with FAA employees across the country and with aviation professionals at air shows, professional gatherings, and more. For most of us in aviation, our work is so much more than a job—it is a passion. I joined FAA 22 years ago to make a difference and I hope my contributions did make a difference. Yet, I know full well that any difference was only possible with the support of a large and talented cast of aviation professionals—my 4,800 colleagues in the Flight Standards Service as well as individuals across the aviation community.

Thank you all for your support. It's been a fabulous ride.

JAMES WILLIAMS

AV News



FAA Issues DC Special Flight Rules Area Final Rule

On December 16, 2008, FAA issued a final rule converting the Washington, DC, Metropolitan Area Air Defense Identification Zone (ADIZ) into the Washington, DC, Metropolitan Area Special Flight Rules Area (SFRA). The rule became effective on February 17, 2009. The rule requires all pilots who operate within 60 nautical miles (nm) of the DC SFRA to receive special awareness training, which is available online at FAASafety.gov.

If you have already taken the training you will not have to take it again. The rule states that it is a one-time requirement. However, FAA strongly recommends that pilots operating under VFR within 60 nm of the DCA VOR/DME review the online course from time to time. The course will be updated to be consistent with the Special Flight Rules Area final rule.

The final rule may be viewed at http://edocket.access.gpo.gov/2008/pdf/E8-29711.pdf.

FAA Changes Inspection Authorization Renewal Process

In March 2009, the renewal process for inspection authorization (IA) holders changes from an annual to a biennial requirement. The new rule requires IAs to submit their renewal paperwork by March 31 of each odd-numbered year, instead of the previous annual March 31 deadline.

Although the rule now requires an IA to renew with the local FSDO every two years, it still requires the IA to maintain currency requirements each year according to Title 14 Code of Federal Regulations section 65.93 (a). The applicant must show completion of one of the following activities by March 31 in each year of the two-year inspection authorization period:

(1) Perform at least one annual inspection for each 90 days that the applicant held the current authority.

(2) Perform at least two major repairs or major alterations for each 90 days that the applicant holds the current authority.

(3) Perform or supervise and approve at least one progressive inspection in accordance with standards prescribed by the Administrator.

(4) Attend and successfully complete a refresher course of no fewer than eight hours of instruction.

(5) Pass an oral test by an FAA inspector to determine that the applicant's knowledge of applicable regulations and standards is current.

An IA who does not complete one of the above activities by March 31 of the first year of the two-year inspection authorization period may not exercise IA privileges after March 31 of the first year. At that point, an IA may resume exercising inspection authorization privileges only after passing an oral test from an FAA inspector.

For more information on the new IA renewal process, contact your local FSDO or check FAASafety.gov for a schedule of free IA renewal seminars.

AMT Awards Program To Go Electronic

The FAA Safety Team (FAASTeam) in concert with the FAA's Aircraft Maintenance Division revised the Aviation Maintenance Technician (AMT) Awards Program. The new AMT Awards Program is online at FAASafety.gov, which offers a simple and paperless process.

The AMT Awards Program was designed in 1991 to encourage AMT employees and employers to participate aggressively in available initial and recurrent maintenance training/courses. The new online AMT Program has a more data-driven approach and enables the training to target accident causal factors. Look for the change details of the new online program at FAASafety.gov.

National Weather Service Issues New TAF

In November 2008, the National Weather Service changed to a new time and date element in the body of all Terminal Aerodrome Forecasts (TAF). Made to conform to international standards, the change also allows for new 30-hour TAFs for certain airports in support of long-haul international operations.

For examples and more information, visit http://aviationweather.gov.

CAMI Researches Genetics and Fatigue

Since 2005, FAA's Civil Aerospace Medical Institute (CAMI) has been working on a study that hopes to isolate changes in gene expressions (the creation of proteins based on the code found in genes) that accompany increasing levels of fatigue. Conditions within the body can affect how a gene is expressed. By looking at changes in gene expression during various states of fatigue, CAMI can tell how fatigue affects humans at a fundamental level. The research project was originally conceived by Dennis Canfield, Bioaeronautical Sciences Research Lab manager, who saw an opportunity to use genomics and molecular science in aerospace medicine.

Dennis Burian, team lead of the functional genomics group at CAMI, says, "We're not going to find a magic bullet where we can say, 'That's our guy. He tells us everything we need to know.' I would virtually guarantee that we end up with a dozen or half-dozen markers."

The goal of the study is to find a specific set of genes that change during periods of high fatigue. But it's not only a matter of finding genes that change due to fatigue—the genes must change significantly. Each person has his or her own genome—or set of instructions. Fatigue-induced gene expression must rise above the level of biological diversity.

Then, there's the possibility of devices that—with a prick of the finger and five minutes of waiting time—can measure whether the right set of gene expressions indicates fatigue or not. If every nurse, truck driver, pilot, or crane operator had to take the test, the cost would go down and, conceivably, alertness would go up.

Burian imagines such a gadget would be a fairly routine addition to our safety culture. "It could either say, 'Yes, you're good to go, or you're not. Get somebody else. You've got to go home and get to bed.'"

Attitude and Altitude: Learning about High-Altitude Ops

by Gloria LaRoche

Today's advanced aircraft and avionics technology makes it possible for more aircraft (and their pilots) to head for the high altitudes. There are advantages to flying high, but, as the cliché goes, aviation is terribly unforgiving of carelessness, incapacity, or neglect. The accident history shows that many perils lurk for the pilot who is unwary or, worse, unaware of high altitude aerodynamics.

If you aspire to fly in the high-altitude environment, this news is for you. The rules (Title 14 Code of Federal Regulations section 61.31(g)) say that anyone seeking to operate as pilot in command above 25,000 feet MSL must have training and an endorsement on a number of topics: high altitude aerodynamics and meteorology, hypoxia, normal cruise procedures, emergency procedures, and emergency descent procedures.

If you are considering a high-altitude endorsement, take advantage of free online training materials designed to address these topics and educate pilots on the potential pitfalls of the high-altitude flight environment. Specifically, the High Altitude Operations chapter (Appendix 3E) of the online Airplane Upset Recovery Training Aid includes a stand-alone curriculum applicable to airplanes of every size.

Developed in an FAA/industry partnership that included Boeing, Airbus, and the Flight Safety Foundation, the Airplane Upset Recovery Training Aid covers such topics as unintentional slowdowns and stall recoveries in the high altitude environment. It also includes principles of high altitude aerodynamics, flight techniques, engine failures at altitude, and recommended simulator training sessions. You can access the curriculum as a PowerPoint slide presentation or print it out as a handout with notes at www.faa.gov/pilots/training/. If you are interested in physiology training, information is available atwww.faa.gov/pilots/training/airman_education/.

Gloria LaRoche is an aviation safety inspector in Flight Standards Service's Air Carrier Training Branch. She is an airline transport pilot and a certificated flight instructor.

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FEDERAL AVIATION ADMINISTRATION

Aeromedical Advisory

FREDERICK E. TILTON, M.D.
FAA FEDERAL AIR SURGEON

Jelly Jars to ANRs

Hearing is second only to vision as a sensory means of obtaining critical information during aircraft operation. In the early days of aviation, though, our knowledge of how noise affects hearing was as limited as our noise-reduction technology. An Air Force Research Laboratory study notes the first hearing protection efforts included cotton or even chewing gum, and that the first headsets were "basically jelly jars dipped in rubber and put on a headband." Fortunately, hearing protection methods and technologies have improved significantly.

A Noisy World

Hearing damage occurs when loud sound destroys tiny hair cells in the inner ear. These cells convert sound waves into electrical impulses, which are sent to the brain. You experience hearing loss when 25 to 30 percent of these cells disappear.

Daily exposure to high noise levels can cause hearing impairment. The average office can generate around 50 decibels (dB), and the cockpit of a small single-engine airplane exposes you to 70 to 90 dB. Experts generally agree that an acceptable noise level is about 65 to 70 dB, the level of normal conversation.

Researchers have also found increased risk of hearing loss among people who listen to loud music through headphones for extended periods of time. Personal music players can give you a sound exposure as high as 100 to 120 dB. When you are using earbuds, the sound is more concentrated because it travels a very short distance to your eardrum.

Protecting Your Hearing

The most important thing you can do is to limit your exposure to noise. Be mindful of volume and duration when listening to music through headphones or earbuds. For flying, you might want to use several forms of hearing protection. Your options include:

Passive ear protection. Ear plugs made of acoustic foam work well against mid- and high-frequency noise, but do not block low-frequency noise generated by engines, motors, and fans. Low-frequency noise waves are longer, travel farther, and can penetrate passive barriers.

Noise attenuating headsets. These devices use thick gel or foam ear pads to muffle noise. Noise attenuating headsets use clamping action to keep the foam or gel seal tight against your head, but glasses can reduce the effectiveness by breaking the airtight seal.

Active Noise Reduction (ANR) technology. This is more expensive, but it offers the only effective way to attenuate low-frequency noise. Also known as electronic noise cancellation (ENC) or active noise cancellation (ANC), ANR works by electronically coupling a noise wave with its exact mirror image. This process cancels the noise.

For flying, which can expose you to around 90 dB in a small airplane cockpit, you might want to use several forms of hearing protection.

Combination of protection devices. The combination of earplugs with earmuffs or communication headsets is recommended when ambient noise levels are above 115 dB.

Want to Hear More?

For more detailed information on this subject and other important topics, check out the hearing and noise information brochure at www.faa.gov/pilots/safety/pilotsafetybrochures/.

Good health and safe flying!

Dr. Tilton received both an M.S. and a M.D. degree from the University of New Mexico and an M.P.H. from the University of Texas. During a 26-year career with the U.S. Air Force, Dr. Tilton logged more than 4,000 hours as a command pilot and senior flight surgeon flying a variety of aircraft. He currently flies the Cessna Citation 560 XL.

Photo courtesy of Garmin

A New Perspective

Retrofit Market Is a Showplace for Avionics

WES RYAN

Unless you have been living on a remote island, you have likely noticed the dramatic advances in the past five years in the small airplane certified avionics market, especially in "glass" displays. These systems challenged the FAA's Aircraft Certification Service, which is responsible for overseeing the design and production of civil aeronautical products to ensure compliance with prescribed safety standards.

Advances are now all about who is getting "glass" instead of who is going fast.

"We've been called upon to really think beyond our normal perspective or established ways of certifying avionics," said Kim Smith, director of the Small Airplane Directorate. "In the past several years, we worked with a range of innovative companies to bring new equipment to small airplanes."

The result: Rapid changes in aviation-related technology, more rapid than the advances in maximum speed made in the 1950s and 1960s, but this time the advances are all about who is getting "glass" instead of who is going fast. Now, instead of having to pay extra to get glass displays into new airplanes, you need to pay extra to have traditional round dial gauges. Today, the retrofit avionics market is all about who has the best features in their electronic flight instrument systems (EFIS).

A New Landscape

These systems are giving a whole new perspective to small aircraft owners, both figuratively and literally. Figuratively, the change in how we look at glass displays comes from the convergence of decreasing hardware costs, advances in sensor and display technology, and a streamlined regulatory approach to safety-

enhancing technology. Literally, the change is coming from the way many of the display manufacturers present information to the pilot: everything from 3-D primary flight displays (PFD) to multi-function display (MFD) moving maps with an amazing array of features.

These developments are creating a new landscape in the avionics market, particularly in retrofit applications. Companies are betting that owners will want to upgrade from legacy panels equipped with "steam gauges" and are bringing a variety of products and features to a market long overdue for a change. The trend started in 2002 with one of the first synthetic vision display systems certified for small airplane retrofit applications, the Flight Logic EFIS by Chelton Flight Systems (a Cobham Avionics business unit).

The innovative Flight Logic display system combined a PFD and a GPS moving map display into a single system, providing terrain, traffic, and other useful information to the pilot along with primary flight information. This system offered previously unimaginable enhancements to workload and situational awareness, with the 3-D perspective terrain on the primary display making IFR flight look almost like VFR. This system, and others, helped lay the foundation for many of the displays that are fast becoming standard in the small-airplane avionics industry.

What's Old Is New Again

Today, the cost of some integrated systems makes them attractive to an even larger market. Many, such as the Aspen Avionics Evolution and the Garmin G600, are specifically being certified to bring advanced functionality to the retrofit market.

These and other certified avionics systems bring safety-enhancing features to a price-conscious segment of the market. The great news is that it is not just all about pretty colors and remarkable functionality. These certified systems could bring significant safety enhancements to the nearly 200,000 small airplanes flying. Multiple studies have shown that airplanes with GPS moving maps and wide-format attitude display systems can enhance safety by reducing pilot workload and increasing situational awareness. Specific features credited with enhancing safety include:

- Integration of weather, terrain, obstruction, traffic, and airspace information into the GPS moving map, or MFD, along with Terrain Avoidance Warning System (TAWS) or TAWS-like functionality. Some even allow for display of approach charts and airport surface maps.
- Coupled GPS navigators and autopilots that allow the pilot to fly with greater precision, simplifying the task of flying in low-visibility conditions.
- Redundancy in information presented, making failures easier to handle, and greatly reducing the chance of losing critical instruments.

Photo courtesy of Aspen Avionics

Working Together

These displays present some challenges to the FAA, since they were not originally envisioned by the regulatory framework. However, the FAA strongly supports retrofit applications and is working with industry to address regulatory challenges. Aircraft owners interested in installing new avionics equipment can consult the FAA's Supplemental Type Certification database at http://rgl.faa.gov. This site lists companies that hold approvals to put this technology into particular aircraft.

New avionics systems bring safety-enhancing features to a price-conscious market.

By working together, FAA and industry are getting better information to the pilot in a more intuitive manner, which helps FAA and pilots alike get closer to the ultimate goal, which is to make flying safer.

Wes Ryan is the manager of the FAA Small Airplane Directorate's Programs and Procedures Branch.

Buyer Beware

Limitations of Uncertified Avionics Systems

WES RYAN

The number of new "glass" displays for small airplanes, particularly handheld and panel-mounted systems designed for the homebuilt experimental and Light Sport Aircraft (LSA) markets, is staggering. These systems are creating a buzz, since they bring safety-enhancing features to a price-sensitive segment of the market that didn't have many options just a few years ago. Studies by the FAA's Small Airplane Directorate show 20 companies targeting the uncertified electronic flight instrument system (EFIS) market for small airplanes.

When considering a purchase, the first consideration is the intended mission for the new equipment.

If you are in the market for such equipment, this article provides a few tips on making your selection. Always remember, though, that regardless of what you purchase, amateur builders and LSA buyers are responsible for knowing the limitations of the systems in their airplanes.

What Is the Intended Mission?

When considering a purchase, the first consideration is the intended mission for the new equipment. In the old days, avionics in experimental airplanes were mostly the same as those in certified airplanes. With the introduction of more affordable hardware and open-source software, the two worlds can be vastly different.

Many displays are advertised with scant information about design or intended market, but were designed with VFR operations in mind. Some of the lower-priced systems may be acceptable if you are a weekend VFR pilot who never intends to fly in instrument conditions.

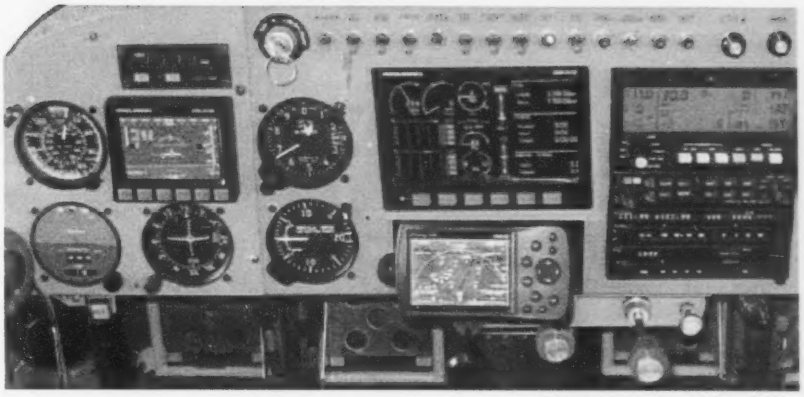
Considerations for IFR Equipment

If, however, the airplane is designed for flying in instrument meteorological conditions (IMC), there are significant operational considerations and system limitations that buyers must understand when considering equipment purchases. Yes, some uncertified systems might meet FAA minimum performance requirements for instrument flight rules (IFR) operations. If you are tempted to take this equipment into IMC, stop to consider that these systems may not have been designed for the rigor of IFR operations. An uncertified system designed for a "blue-sky, see-forever" day in a Light Sport Aircraft will be quite different from one designed for "rainy day, 200-foot ceiling, fast-travel" operations.

The key to selecting the right system is to ask the right questions. Here are some key things to consider when choosing a glass panel for your airplane.

Certification Requirements

Has the system been proven to meet applicable FAA certification requirements for design or installation approval through the Technical Standard Order (TSO) and Supplemental Type Certificate (STC) processes or by some other



A composite representation of a possible uncertified panel that could be used in an experimental aircraft.

Original photo courtsey of Doug Reeves

means? If so, it is likely that the system was designed with IFR operations in mind.

If not, there is no way of knowing if the system meets the FAA's intent for minimum operational performance implied by the requirements of Title 14 Code of Federal Regulations (14 CFR) section 91.205, which states requirements for standard category airplanes and implies a precedent for LSA and experimental airplanes. Without some type of FAA approval of the design, the system may or may not operate consistently or accurately in different environments.

While TSO authorization is not required for a product to gain installation approval by the FAA, it is the most reliable way to document the minimum performance capabilities of a system independent of the installation. Other ways to document minimum performance require analysis on a case-by-case installation basis.

Electromagnetic Interference

Have the system and installation requirements been designed to resist interference from electromagnetic interference, high intensity radiated fields, and lightning energy? If not, the system probably wasn't designed with IFR operations in mind. Without proper attention to these items, the system may fail with a nearby lightning strike or provide false data when encountering an approach surveillance radar sweep. No one wants the box to fail just as you cross the outer marker. Even if the manufacturer has done environmental testing, buyers should ask for details because the testing may not have been performed to the same levels as for certified displays.

Aviation-Grade Materials

Has the manufacturer used aviation-grade hardware and sensors, and do they provide a level of reliability in the design that fits the criticality of the installation? If not, the system may not have been designed to be a source of critical information for IFR operations. Some systems are designed using automotive-grade hardware, but you don't get to pull over and troubleshoot when you are flying in the clouds.

Integration and Installation

Has the manufacturer's documentation addressed potential integration and installation issues to allow safe installation? If not, the system may interfere with other flight-critical systems or, in a particular installation, may not function accurately. There may be a limited set of equipment the interface was designed to accommodate so installations may not be appropriate for a particular airplane. This point is especially important for integration with an autopilot where problems could result in loss of control.

You don't get to pull over and troubleshoot when you are flying in the clouds.

You Only Need to Ask

Don't hesitate to contact the manufacturer with questions regarding installation of these systems. Also, operations under instrument rules, or in airspace where altitude information must be encoded to Air Traffic Control, may require certified equipment. At an early stage, you may want to consult with the FAA regarding whether a particular system must be certified to meet the intent of 14 CFR section 91.205 for the type of operations to be conducted.

If you are tempted to take this equipment into IMC, stop to consider that these systems may not have been designed for the rigor of IFR operations.

Wes Ryan is the manager of the FAA Small Airplane Directorate's Programs and Procedures Branch. Contributors to this article included Steve Thompson, Jim Brady, and Lowell Foster, all from the Small Airplane Directorate.

GPS with Vertical Guidance

The Lowdown on Going Low

LARRY O. OLIVER

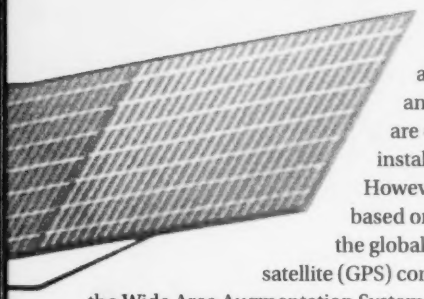
When I first started flying, there were two types of instrument approaches. The first kind was the precision approach, so named because it incorporates vertical guidance. The second was the non-precision approach, which offers only lateral guidance. Pilots flying a non-precision approach learn the "dive-and-drive" drill, which calls for a quick descent from final approach fix (FAF) to minimum descent altitude (MDA). The MDA must be strictly maintained unless and until the runway is in sight and the aircraft is in position for a normal descent and landing.

Boeing illustration

It sounds straightforward and, during training flights, it usually is. The challenge comes with the demands of the non-precision approach in actual instrument conditions. Even for experienced pilots, the combination of low altitude, low airspeed, and looking outside for the runway during a non-precision approach can be challenging. Controlled Flight into Terrain (CFIT) accidents have resulted when pilots were not up to those challenges.

What's in a Name?

The good news is there is now a third type of instrument approach: "approach with vertical guidance" (APV). The traditional precision and non-precision approaches rely on ground-based navigation aids, such as the localizer and glide-slope antennas, which are expensive to install and maintain. However, the APV is based on signals from the global positioning satellite (GPS) constellation and the Wide Area Augmentation System (WAAS) that FAA certified in 2003.



WAAS has improved on GPS to the point where WAAS approaches can provide minimums equivalent to Category I instrument landing system (ILS) minimums, i.e., as low as 200 feet above ground level (AGL). Together, GPS and WAAS eliminate the need for airport-specific navigation aids, which means that more airports in more places can benefit from having one or more APV approaches.

Since APV approaches include vertical guidance and can, in some cases, provide approach minimums equivalent to Category I ILS, you may wonder why FAA doesn't simply classify them as precision approaches. Here's the answer. Officially, the APV is different because it does not meet the International Civil Aviation Organization (ICAO) and FAA precision approach definition. That definition applies mostly to localizer and glide-slope transmitters. In addition, FAA and ICAO definitions for a "precision approach" carry a great deal of documentation, definition, and associated costs. Rather than try to change these standards and the associated international agreements, both ICAO and FAA adopted the term APV.

Why Not Call It WAAS?

The development of WAAS-enabled GPS approaches led to the creation of new terms on certain instrument approach charts. One of these is "RNAV(GPS)." You may ask why you see this term rather than "WAAS" in the upper right-hand corner of an instrument approach chart. Since WAAS is the source of the approach guidance, why aren't they called "WAAS" approaches?

The "RNAV (GPS)" format allows chart makers to publish GPS and WAAS approaches on the same page.

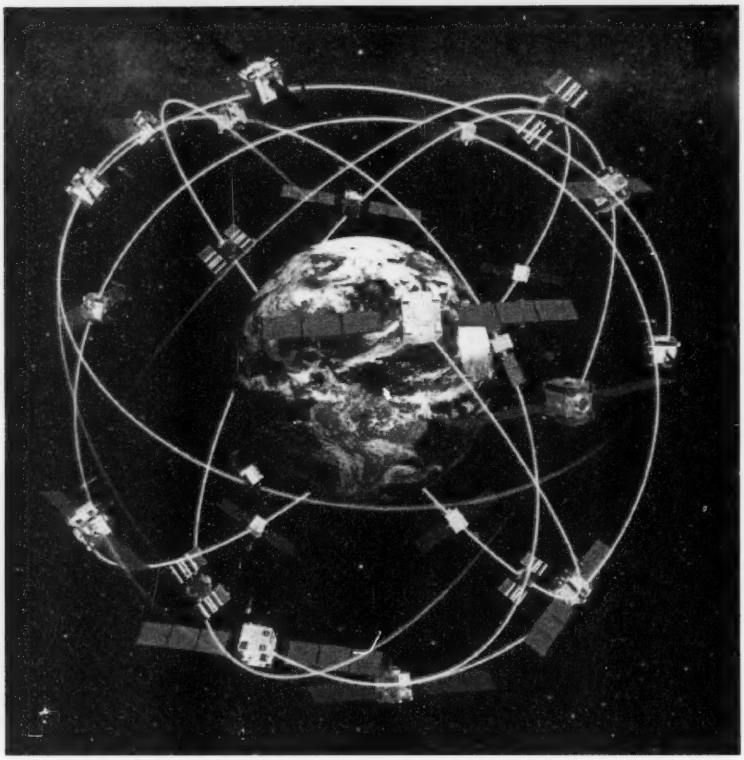
Here's the story. FAA broke with 40 years of tradition to improve the approach chart format. In the past, FAA named approaches for the primary sensor and listed that term in the upper right corner, e.g., VOR RWY 24 or ILS RWY 6. With the advent of WAAS, it quickly became clear that continuing this format would double the size and number of approach chart booklets. The solution was to use the term "RNAV (GPS)" with the runway number, e.g., RNAV(GPS) RWY 24. This format allows chart makers to publish GPS and WAAS approaches on the same page, with the minimums associated with GPS only or WAAS on the same chart.

To use an approach with the RNAV(GPS) notation, you must have certified and approved area navigation (RNAV) equipment.

An approach chart with the RNAV(GPS) notation means that you must have certified and approved area navigation (RNAV) equipment in order to use that procedure. You must then look at the minimums section to determine whether it is a GPS or WAAS approach.

Learning the "L-phabet"

So, how *do* you know whether it is GPS or WAAS? To answer that question, look at the terms in the minimums section of RNAV(GPS) charts. Since



Courtesy of Boeing

An illustration showing the GPS satellite constellation.

they all begin with the letter "L," you can think about it as learning the "L-phabet" needed to spell safety and success in flying these approaches.

GPS Approaches

LNAV. This is the abbreviation for "lateral navigation." LNAV is the basic GPS approach. Like the traditional non-precision approach, an approach with LNAV minimums provides only lateral guidance. LNAV approaches lack vertical guidance and can be flown via "dive and drive" down to an MDA. The main difference between an LNAV approach and a traditional VOR or NDB is the source of the navigational guidance. In VOR and NDB, it comes from a ground-based navigation aid. With LNAV, the navigational guidance comes from GPS.

LNAV+V. There is no "LNAV+V" approach, so you will *not* see this particular notation on a published approach chart. However, because you may see it on your moving map navigator or electronic horizontal situation indicator (HSI), you need to understand clearly what it does, and does not, mean.

Some WAAS-enabled GPS units provide advisory vertical guidance in association with GPS approaches. The LNAV+V notation is simply the equipment manufacturer's term for a GPS approach that includes an artificially created advisory glide path from the final approach fix to the touchdown point on the runway. The advisory glide path can provide a stabilized approach and eliminate the need for "dive and drive" descent to the MDA, but you need to understand clearly that an approach with the LNAV+V notation is *not* the same as LNAV/VNAV or LPV (see below).

Like any non-precision approach, a GPS approach with the LNAV+V notation on your moving map navigator is flown to the published MDA, which in this case is the MDA associated with LNAV minimums. It is still GPS, flown to LNAV minimums, and the advisory "+V" is simply a means for the pilot to achieve a predictable rate of descent.

How WAAS Works

The Wide Area Augmentation System (WAAS) uses a series of 38 receiver sites throughout North America. Each site receives signals from all GPS satellites in view. The site transmits this information to a WAAS master site, where the major sources of GPS errors are analyzed. The master site then develops a correction message, which is transmitted to two geostationary satellites (Geos). The Geos re-transmit the correction message to your WAAS-enabled aircraft receiver, which applies the correction. While basic GPS typically has an error of around 25 meters (horizontally), the corrected WAAS position calculation is usually within two or three meters.

In addition to the correction message, the Geos broadcast a positioning message that can be used by your WAAS-enabled receiver. This means you typically have two additional satellites always in view over North America. While GPS requires you to perform a check to ensure that you have sufficient positioning information, WAAS-enabled equipment has no such requirement because of the additional Geos and the number of GPS satellites assured of being in view.

WAAS and Other Approaches with Vertical Guidance

LPV. The improved accuracy of WAAS enabled FAA to develop the LPV approach, which is the term for "localizer performance with vertical guidance." The LPV is a WAAS approach that provides vertical guidance to as low as 200 feet AGL. It is flown to a decision altitude (DA) and uses the same criteria as an ILS. The difference is that LPV is based upon the WAAS system positioning signal instead of a ground-based localizer and glide-slope transmitter.

This development means that the guidance source is available to every airport in the continental United States with no requirement for additional navigation equipment. In other words, every runway end is a potential candidate for a vertically guided approach. The only limiting factor is airport infrastructure: To be eligible for an LPV approach an airport must still meet the standards for runway length, width, obstacle-free zones, and no glide-slope intrusions. FAA plans call for an additional 500 GPS-based approaches to be added in 2009 and most will be LPV approaches.

LNAV/VNAV. You may see this notation on the published approach chart. The term stands for "lateral navigation/vertical navigation." LNAV/VNAV is an approach with vertical guidance (APV) in the ICAO sense of the term, and it is flown to a DA rather than an MDA. It is *not* a WAAS approach; in fact, LNAV/VNAV existed before the WAAS system was certified. In the past, only aircraft equipped with flight management systems (FMS) and certified baro-VNAV systems could use the minimums associated with LNAV/VNAV. Now, however, LNAV/VNAV approaches may also be flown using WAAS equipment.

Future WAAS Approaches

LP. The term "localizer performance" is one you will see on future approach charts. As with ILS approaches, there may be places where an obstruction would require a high DA. Just as there are localizer-only approaches, in the future there will be equivalent WAAS procedures with "LP" minimums. A WAAS LP approach will provide accurate lateral guidance, but no vertical guidance. The improved lateral accuracy of the LP approach will allow minimums as low as 300 feet AGL without any vertical guidance. The first LP approaches are scheduled for publication in summer 2009.

Now You Know

Satellite navigation, which has improved the efficiency of the National Airspace System, has been a remarkable success story. For one, FAA can build area navigation (RNAV) routes, such as the new "Q" routes and "T" routes, without concern about installing a VOR in a particular location. Instead, the decision is based on optimum routing. With WAAS, there is now ILS-like accuracy available throughout North America without relying upon ground-based navaids. FAA also has the ability to add hundreds of new instrument approaches each year instead of dozens.

Learning the "L-phabet" terms associated with GPS and WAAS approaches is essential.

It's a great time to be an instrument pilot!

Larry Oliver is with Flight Standards Service's Flight Technology Requirements Branch.

For More Information

FAA GPS Web site
http://gps.faa.gov

FAA Real-time WAAS Analysis Tool
www.nstb.tc.faa.gov/index.htm

Official U.S. Government GPS Portal
www.gps.gov/

Friend *or* Foe

Working with your Autopilot

WES RYAN

Adrian Eichhorn photo

What's your comfort level with your airplane's automation? Are you one of the devoted hand-flyers who takes pride in never touching the knobs of your autopilot? Or, are you part of the "Nintendo generation" who wonders how long you could go during a flight without actually touching the controls?

Regardless, we can all agree that autopilots and automation in small airplanes have come a long way from the days of the first autopilot designed by the brilliant Lawrence Sperry. Until recently, small airplane autopilots were little more than glorified wing levelers. They were often temperamental, requiring very specific conditions to be engaged.

FAA is committed to certifying autopilot systems, both for new airplanes and for the retrofit market.

Not your Father's Autopilot

With new sensor, servo, and processor technology and advances in avionics integration techniques, today's small-airplane autopilots are nearing the capabilities of large-airplane Flight Management Systems. The new autopilots are more forgiving in the way they engage and operate, are more reliable than ever, and may even be considered required equipment for some of the new technologically advanced airplanes. They can do much more than just hold heading or altitude, and are bringing GPS-coupled approach capability to airplanes whose pilots would have only dreamed of having such capability just a few years ago. Who knew flying a DME arc could be so easy?

These developments, along with a requirement in the current instrument rating practical test standards (PTS) for demonstration of proficiency with the installed autopilot, are persuading even some of the most hardcore hand-flyers to reconsider. It is a positive development, since studies show that even a basic autopilot can provide substantial safety benefits. Autopilots can reduce pilot workload, buy time when the pilot gets "behind the airplane," and make flying complex procedures easier. History also shows that airplanes with a factory-equipped basic autopilot or wing leveler have a better safety record than those without.

Bendix/King photo

With these facts in mind, it is no surprise that FAA is committed to certifying autopilot systems, both for new airplanes and for the retrofit market. In addition, FAA is working with industry on future autopilot technologies, such as devices that could protect from stall or fly the airplane home if the pilot is incapacitated. Such capabilities could hold the key to big improvements in small airplane safety and possibly even remove the current requirement for a second crew member in some types of operations.

Know and Respect your Equipment

Pilots must understand and respect aircraft systems. An autopilot can help you, but it can also help you get into trouble if you are not well versed on how to use it. It is tempting to get into the routine of engaging the system right after takeoff and disengaging only when you reach short final. It is certainly tempting when a course change or altitude change is simply a knob twist away, and most new systems will follow your GPS flight path with ease.

Today's small airplane autopilots are nearing the capabilities of large airplane Flight Management Systems.

To keep your hand-flying skills sharp, consider hand-flying every other flight, or even every other leg of your flight. If you constantly use your autopilot from wheels up to wheels down, you may be allowing your skills to get rusty.

Whether your airplane is already equipped with an autopilot or whether you are considering adding or upgrading, your time will be well spent learning all you can about how to use your autopilot, understanding its limitations, and keeping your hand-flying skills sharp.

Wes Ryan is the manager of the FAA Small Airplane Directorate's Programs and Procedures Branch.

Autopilots can be a separate interface or part of an integrated avionics suite.

Susan Parson photo

SUSAN PARSON

Checklist

New Technology, New Techniques

Spring is that wonderful time of year when humans and their airplanes emerge from winter hibernation and head out to enjoy the sunny warmth of a new flying season. It is also a time of renewal and discovery, as well as the showcasing of new gadgets at events such as the Sun 'n Fun® Fly-In. It's fitting to devote this issue to some of the advanced technologies that are renewing interest in general aviation aircraft, and changing the way we use them.

As always, getting the most out of technology requires proper training. Several articles in this issue focus on how FAA is promoting the development and implementation of advanced technology. The article on advanced training devices (ATD) describes FAA support for the exciting advent of "hi-fi" simulation in GA flight training.

New Aviation Instructor's Handbook

The FAA has been busy updating its handbooks to incorporate modern flight training theories and techniques. One of the biggest changes in the new *Aviation Instructor's Handbook* (FAA-H-8083-9A) is the addition of information on scenario-based training (SBT). SBT is a training system that teaches concepts and maneuvers in a "real-world" context. For example, cross-country training can be structured as planning for a family vacation. The importance of comprehensive flight planning becomes very realistic when the pilot has to put it in terms of how many people and bags can be carried, and how they have to be loaded. The SBT approach creates many "teachable moments" (i.e., times when the pilot is completely primed to learn a particular lesson), and promotes development of judgment by including the kind of external pressures that a pilot will face in the real world. A chart in the back of the handbook (Appendix F) illustrates the relationship of SBT to various decision-making and risk-management models.

The FAA has been updating handbooks to incorporate modern flight-training theories and techniques.

The new *Aviation Instructor's Handbook* also offers updated guidance on assessment. Instead of the traditional teacher-talks-student-listens model, the new handbook presents "collaborative critique" as a way to develop pilot judgment and self-assessment capability, while giving the instructor a clearer picture of the pilot's aeronautical decision-making skills.

New Pilot's Handbook of Aeronautical Knowledge

Another book that merits a second look is the newly-updated *Pilot's Handbook of Aeronautical Knowledge* (FAA-H-8083-25A). Some topics, e.g., aerodynamics, haven't changed a lot, but you will find an entirely new chapter on aeronautical decision-making. The chapter includes tips for maintaining situational awareness while making effective use of the new avionics and automation devices found in most current production aircraft.

More to Come

Stay tuned for a revised version of the *Airplane Flying Handbook* later this year, and a brand-new *Risk Management Handbook* is almost ready for release. Whether you are a student pilot, an instructor, or an aspiring instructor, you'll find a wealth of useful information to review, learn, and, most important, to use in your ongoing aviation education.

Susan Parson is a special assistant in Flight Standards Service's General Aviation and Commercial Division. She is an active general aviation pilot and flight instructor.

For More Information

Aviation Instructor's Handbook (FAA-H-8083-9A)
www.faa.gov/library/manuals/aviation/media/FAA-H-8083-9A.pdf

Pilot's Handbook of Aeronautical Knowledge (FAA-H-8083-25A)
www.faa.gov/library/manuals/aviation/pilot_handbook/

GA Flight Simulation Goes Hi-Fi

University of North Dakota photo

It is a dark and stormy night. You are at the controls of your rented single-engine aircraft watching your flight's progress on the moving map display and deviating (with air traffic control approval, of course!) as necessary to maintain a safe distance from the datalink weather shown on the multi-function display (MFD). Moderate chop makes the flight a bit uncomfortable for your passengers, but all is well—that is until your primary flight display (PFD) suddenly fades to black. What do you do?

Is It Real or Is It Memorex®?

Pilots of corporate jets and airliners have long benefited from the ability to practice coping with realistic situations in the safety of a high-fidelity simulator. The strong U.S. commercial aviation safety record reflects the benefits of this approach to training. While desktop procedures trainers and computerized aviation training devices (ATD), such as the Personal Computer ATD (PCATD), have long been available to general aviation pilots, advances in computer technology have increasingly made high-end flight simulation fidelity more affordable and accessible to the GA training community.

New Advisory Circular 61-136

The FAA has long supported the use of simulation technology for GA flight training, especially with the increased emphasis on scenario-based training. Many pilots are already familiar with PCATDs and the level 1, 2, and 3 flight training devices (FTD) that FAA's National Simulator Program staff approved for credit toward meeting certain flight training and proficiency requirements. Recognizing that a "one-size-fits-all" approach was not appropriate for devices intended for GA pilot training, FAA transferred policy authority for PCATDs and FTDs to its General Aviation and Commercial Division.

Advances in computer technology have increasingly made high-end flight simulation fidelity more affordable and accessible to the GA training community.

The new Advisory Circular (AC) 61-136, *FAA Approval of Basic ATDs and Advanced ATDs*, addresses several important issues about the use of simulation technology for GA training.

- First, it introduces and defines new terms for ATDs used in GA training: "Basic ATD"

An instructor and student conduct a lesson in an advanced aviation training device.

(BATD) and "Advanced ATD" (AATD). These terms replace the Personal Computer Aviation Training Device and the Level 1, 2, and 3 Flight Training Devices. This change reflects the status of BATD and AATD as "next generation" devices that incorporate the latest in computer/visual display hardware and software technologies.

- Second, AC 61-136 sets out a more streamlined and timely process for approving flight simulation devices for the GA training community. There have been significant advances but, like certifying an aircraft, approving an ATD for flight training credit requires meeting minimum standards. AC 61-136 provides the necessary guidance.
- Third, AC 61-136 summarizes how pilots may use these devices to meet requirements for training or recency of experience. (*See sidebar on next page.*)

One quick note: FAA has adopted BATD and AATD as terms for devices that are approved and authorized starting now. You will continue to see the terms PCATD and FTD 1-3 applied to flight simulation devices that were approved/authorized prior to adoption of the new guidance. These devices are "grandfathered" as long as they continue to operate in accordance with the terms of their approval and authorization, but they will not be approved as BATD or AATD.

Frasca International photo

The advancement of visual displays and avionics has led to changes in the way FAA reviews and approves aviation training devices.

Change Is the Only Constant

Recognizing that technology continues to improve, FAA is actively considering ways to permit increased usage of ATDs in GA pilot training. Already, ATDs are proving to be valuable for training pilots for appropriate use of new avionics technologies in modern GA aircraft. For questions on ATD regulations, policy, or guidance, or if you seek to incorporate an ATD into your flight training program, you will want to first read AC 61-136 and, as needed, contact your local Flight Standards District Office. The advisory circular can be found at http://rgl.faa.gov. To view the AC, click on Advisory Circulars and type 61-136.

Information courtesy of Flight Standards Service's General Aviation and Commercial Division.

University of North Dakota photo

The Benefits of BATDs and AATDs

FAA Advisory Circular 61-136 provides guidance on how the FAA approves Basic and Advanced ATDs. It also summarizes how pilots may use these devices.

Basic Aircraft Training Device (BATD)

Though similar to a PCATD, a BATD generally has more enhanced hardware and software features that allow the FAA to authorize it for certain training and proficiency "credits." These credits include:

- Not more than 10 hours toward instrument rating flight instruction time under Title 14 Code of Federal Regulations (14 CFR) section 61.65(e)(2) or 14 CFR part 141, appendix C;
- Use in accomplishing instrument recency of experience requirements of 14 CFR section 61.57(c)(1); and
- Not more than 2.5 hours of training under 14 CFR section 61.109(k)(1) on introduction to operation of flight instruments (except as limited by 14 CFR part 141 appendices).

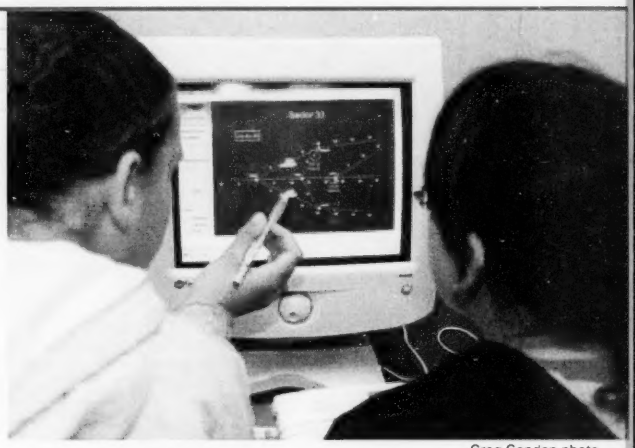
Advanced Aircraft Training Device (AATD)

An AATD is comparable to what the FAA previously approved and authorized as a level 3 Flight Training Device (FTD 3). An AATD must meet BATD-approval criteria, but it must also incorporate additional features and systems fidelity that provide ergonomics "representative" of a category and class of aircraft flight deck. The AATD does not need to replicate a specific aircraft make and model, although many devices do. These features allow the FAA to authorize an AATD for the following training and proficiency "credits."

- Instrument rating - maximum 20 hours (same as a FTD 3)
- Instrument rating practical test - per FAA-S-8081-4 (same as a FTD 3)
- Instrument Proficiency Check - per FAA-S-8081-4 (circle-to-land not authorized) (same as a FTD 3)
- Private pilot certificate - maximum 2.5 hours (same as a FTD 3)
- Commercial pilot certificate - maximum 50 hours (same as a FTD 3)
- Commercial pilot practical test - per FAA-S-8081-12 (same as a FTD 3)
- Airline Transport Pilot certificate - maximum 25 hours (same as a FTD 3)
- Airline Transport Pilot practical test - per FAA-S-8081-5 (same as a FTD 3)
- 14 CFR part 141 as limited by the applicable appendices, or under a special curriculum approved under 14 CFR section 141.57 (same as a FTD 3)

Math + Air Traffic Control = Success

GREGORY CONDON



Greg Condon photo

The next time you notice a school, pause for a moment and consider this: Within the next 10 to 15 years, today's middle school students will be the architects, designers, builders, and operators of the Next Generation Air Transportation System (NextGen). The pressing need to upgrade the National Airspace System (NAS) requires a workforce skilled in science, technology, engineering, and mathematics (STEM). Yet, the United States currently lags behind other countries in STEM education.

Introducing Smart Skies™

In an effort to motivate students to study these disciplines, the FAA and the National Aeronautics and Space Administration (NASA) have created an educational partnership centered on NASA's Smart Skies, which offers a unique approach to teaching mathematics.

In a nutshell, Smart Skies uses the real-life daily experiences of air traffic controllers as a teaching tool. With Smart Skies, students increase their mathematics comprehension and problem-solving skills and also begin to understand the challenges facing the NAS. Starting with basic experiments and traditional paper-based learning methods, students can progress to separating and sequencing flights to San Francisco (SFO) through the Oakland Center's Sector 33 through use of a realistic online simulator.

Smart Skies uses the real-life daily experiences of air traffic controllers as a teaching tool.

LineUp with Math™

One of two Smart Skies options, LineUp with Math features an online interactive computer simulation of air traffic control situations in a realistic route structure with two to five airplanes. Sitting at air traffic control screens, students act as controllers and explore "lining up" several planes safely, with proper spacing, at an intersection where multiple jet routes meet. Using paper-based workbooks, students learn the math to minimize flight delays.

FlyBy Math™

The second Smart Skies option, FlyBy Math, uses a combination of hands-on experiments and paper-based instructional materials to develop students' analytical capabilities, help them understand the basic rules of linear distance-rate-time relationships, and increase their analysis and prediction skills. Using up to six different math methods, students examine the positions of two airplanes flying on intersecting routes or on the same route.

Making the Grade

The Smart Skies software and instructional materials have been tested with more than 130 teachers and some 7,000 students in classrooms across the country. All of these materials, including the workbooks and guides, are free and downloadable to any computer system. More

Greg Condon photo

Volunteers work with kids as part of Smart Skies at AirVenture®

importantly, Smart Skies is aligned to the middle grades mathematics standards for all 50 states.

FAA and NASA are conducting a coordinated outreach campaign to familiarize students and teachers across the United States with Smart Skies. Examples of these stimulating and engaging hands-on math experiences include: teacher training workshops, classroom visits, career days, FAA Aviation Career Education (ACE) summer academies, museum workshops, and fly-ins such as KidVenture EAA®. In addition, FAA and NASA are collaborating with professional aviation organizations, such as the National Air Traffic Controllers Association (NATCA) and the Civil Air Patrol (CAP). The expansion of Smart Skies into schools across the country increases understanding and excitement about NextGen and helps lay the foundation for the education and skills needed to develop and operate the NAS.

Gregory Condon is the project manager for the NASA Smart Skies™ Education Project located at NASA Ames Research Center. Condon holds a master's degree from Rensselaer Polytechnic Institute in mechanical engineering and a master's in business administration from Stanford University.

For More Information

To learn more about Smart Skies and to access materials that you can use to conduct outreach activities, visit the project's informal education Web site at
http://smartskies.nasa.gov

To see the air traffic control simulator, go to
www.atcsim.nasa.gov

To get involved with Smart Skies, please contact your Regional Education Program Manager at
www.atcsim.nasa.gov
Click the link- Aviation & Space Education Contact Us.

Greg Condon photo

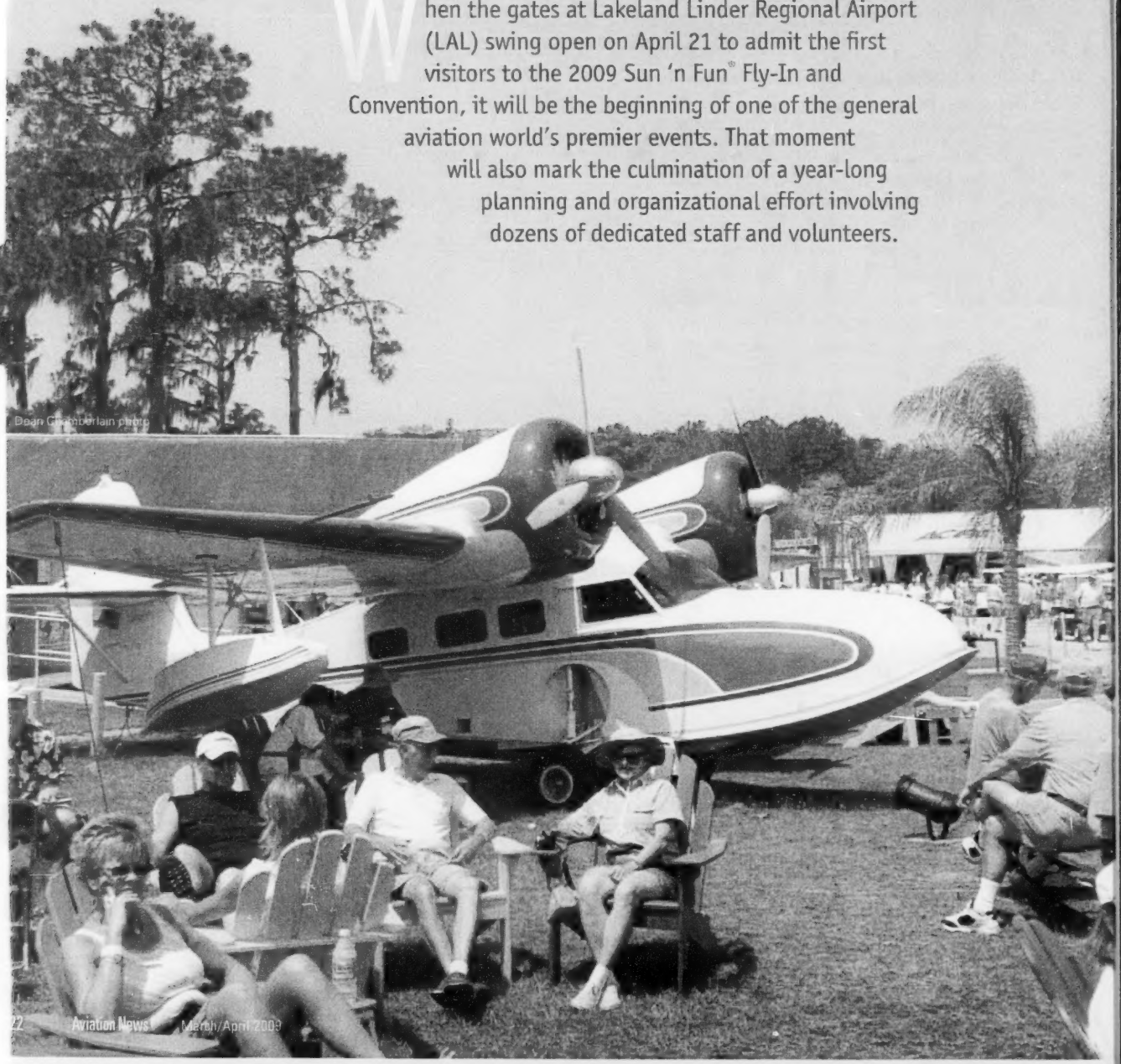
Students gain experience with specialized computer programs as part of their Smart Skies experience.

READY *to* SHINE

Supporting Sun 'n Fun®

SUSAN PARSON

When the gates at Lakeland Linder Regional Airport (LAL) swing open on April 21 to admit the first visitors to the 2009 Sun 'n Fun® Fly-In and Convention, it will be the beginning of one of the general aviation world's premier events. That moment will also mark the culmination of a year-long planning and organizational effort involving dozens of dedicated staff and volunteers.



Dean Chamberlain photo

H. Dean Chamberlain photo

A pilot inspects the preflight contest airplane outside the FAA National Resource Center.

"I don't think most visitors realize what an enormous effort it takes to make it all run so smoothly," says Don Dodge. As the frontline manager of the FAA Safety Team's (FAASTeam) National Resource Center (NRC) in Lakeland, Florida, Dodge has led FAA's participation and support for this annual event. "In addition to the full-time staff, we issue credentials to about 70 volunteers just for the work we do on Sun 'n Fun in our broadcast and production studios."

Meet Early, Meet Often

The team's first planning meeting for the 2009 edition of Sun 'n Fun took place in mid-July, right about the time that most of the GA community's focus was turning northward to the annual EAA AirVenture® in Wisconsin. At the meeting, representatives of Sun 'n Fun Inc., which owns and runs the event, along with the FAA team and members from other participating groups, talked through "lessons learned" from 2008. In August, representatives from the NRC met with FAA's Southern Region, which has overall responsibility for the agency's participation.

"There are a lot of meetings," Dodge says, because there are so many things to arrange and organize. What the public sees most—and a key point of the FAA's participation—is what goes on in the exhibition center and safety forum. That means finding and scheduling great speakers for the forum and preparing the schedule ahead of time for publication. Dodge also stresses the coordination required with multiple FAA offices on their displays and exhibits in the NRC building. That, in turn, leads to some of the less visible, but vitally important, FAA staff "backstage" work.

"We have lots of logistical challenges," says Dodge. "We have to find space for everyone and everything, which can involve many pallets of material. The communication support requirements are also significant: We have to make sure that phone service, Internet access, and conference space are all available to staff working the event and to senior FAA officials."

James Williams photo

Visiting dignitaries tour the FAA Production Studios which hosts the FAA Forum at Sun 'n Fun.

Fly In or Tune In

In the spirit of keeping up with the times, Dodge noted that the NRC is also looking at using media, such as podcasts and YouTube, to share the fun (and, more importantly, to share the safety information) from Lakeland. "One of FAA's goals is international leadership," notes Dodge, "and we want to stay out front in this area." Events like Sun 'n Fun provide a way to showcase new aviation technologies; the NRC wants to ensure that up-to-date communications methods and technologies are available to share these developments with a worldwide audience.

Don't Miss a Thing!

Especially for those who get to Lakeland for this year's Sun 'n Fun, Dodge and the rest of the FAA planning team urge you to take full advantage of all the safety-focused learning opportunities at this event. "The FAA has a lot to offer in the National Resource Center," stresses Dodge, "so don't miss the opportunity to see and hear everything you possibly can. There is a lot of free information and assistance available, and we're here to help in any way." Check out the FAASTeam's Web site at FAASafety.gov for more information. Click on events and type in keywords "Sun 'n Fun."

Dodge also notes that FAA's North Florida Flight Standards District Office (FSDO) will set up a "full-blown working FSDO" in Lakeland for the duration of Sun 'n Fun. Lockheed Martin Flight Service will also be on-site for pilot weather briefings and FAA's Air Traffic Organization will bring in extra personnel and equipment to support and facilitate the fly-in part of the event. The bottom line: Have fun and don't miss a thing!

FAA Forum Schedule

If you are going to Sun 'n Fun and attending the forums, the FAASTeam National Resource Center's schedule of speakers is on the next page.The Forum opens daily at 0800 and the schedule is subject to change.

Go to *www.faaproductionstudios.com* or *FAASafety.gov* to check for updates or to see all these seminars LIVE, click on the "View Safety Seminars Live" link.

All or part of some of these presentations are simulcast on Sun 'n Fun Radio AM1510. Look for presentations on ATN, the Aviation Training Network; GETN, The Government Educational Training Network; and FAN, The Florida Aviation Network (*www.floridaaviationnetwork.com/*) on April 21, 22, 23, and 24 at 1130 Eastern. Meet the FAA will be at 1300 Eastern on Friday, April 24.

H. Dean Chamberlain photo

The FAA Production Studios at the FAASTeam National Resource Center presents the FAA Forum Schedule for

Sun 'n Fun ® 2009 "Spring Break for Pilots"

	0830 – 0930	1000 – 1100	1130 – 1230	1300 – 1400
Tuesday, April 21	**When to Solo a Student** Walt Schamel *2004 ASC of the Year*	**Helicopter Training Accidents** James Lamb *FAASTeam*	**New Automated AMT Awards Program** Bryan Neville *FAASTeam*	**Airspace Deviations** Karen Arendt *FAASTeam*
Wednesday, April 22	**Surviving Forced Landings** Eric Basile	**WINGS** Bryan Neville *FAASTeam*	**Cloudy Skies, Clear Judgment** Susan Parson *FAA Aviation News*	**Human Factors and Surface Safety Update** Dan Cilli *Office of Runway Safety*
Thursday, April 23	**General Aviation Airport Surface Incident Mitigation Strategy (ASIMS)** Theo Mavridoglou *FAASTeam*	**Mastering Takeoffs and Landings** J.J. Greenway *AOPA-ASF*	**Practical Risk Management** John & Martha King	**Takeoffs and Landings** Jim McElvain *FAASTeam*
Friday, April 24	**Teaching in the Glass Cockpit** Tina Oborny Kerry Hackney	**Maintaining your Medical** Dr. James Fraser *Deputy Federal Air Surgeon*	**GPS from the Ground Up** J.J. Greenway *AOPA-ASF*	**Meet the FAA**
Saturday, April 25	**Accident Investigation, What Happens When the Phone Rings** Mike Busch *Cirrus Aircraft*	**Guide to Rotax Aircraft Engine Maintenance** Phil Lockwood	**Mastering Takeoffs and Landings** J.J. Greenway *AOPA-ASF*	**GPS from the Ground Up** J.J. Greenway *AOPA-ASF*
Sunday, April 26	**Flying the Islands of the Bahamas** Greg Rolle	**Owner/Operator Responsibilities in Aircraft Maintenance** James Nichoff *FAASTeam*	**Takeoffs and Landings in Vintage and Surplus Aircraft** Bob Thorson *FAASTeam*	**Flying Mexico** Rick Gardner

Please note schedule subject to change. Check FAASafety.gov for any updates.

DOUG STEWART

Ahoy There!

Adding a Seaplane Rating

Editor's note: A glance at a map shows that Lakeland, Florida, home to Sun 'n Fun®, is aptly named. Each year, the lure of the lakes draws many pilots to try floatplane flying to enhance their overall pilot skills. Although author Doug Stewart won his water wings in New York, his well-told tale of the transition illustrates there is always something new—and fun—to learn about flying.

"Don't flare. Don't flare. You're pulling back on the stick. Don't flare!" These words were loud and clear in my headset, but it was so difficult not to add even just a little bit of back pressure as we got closer and closer to the surface. Our go-around point was still about 1,000 feet in front, so I endeavored not to raise the nose beyond the ever-so-slightly nose-high attitude I had already established, and I kept power set for a 100-foot-per-minute descent rate at 10 knots above the Bellanca (7GCBC) *Citabria's* stall speed.

Since there was no wind, our ground speed was virtually the same as our airspeed and the hills on either side seemed to be whizzing by. They also appeared to race by below, as the calm glassy water of the lake reflected not only the hills beside me, but the sky above. There was no way to judge altitude above the water, so I proceeded as instructed. I resisted the urge to pull into more of a flare and within another second the *Citabria's* floats touched down, well short of my pre-chosen go-around point. As I closed the throttle and pulled the stick all the way back, the airplane decelerated rapidly. I had just completed my first glassy water landing and I was well on my way to the addition of "Airplane Single-Engine Sea" (ASES) to my pilot certificate.

I have done many totally exciting and enthralling things in airplanes, but seaplane flying was quickly floating to the top of the list (pun intended). I have wanted to add the seaplane rating for many years. Last year, my best friend beat me to the punch and got her ASES rating, so I just had to get mine too.

Pre-Splash Checklist

The excitement started with the preflight inspection. While I consider myself fairly agile for my age, it was a challenge to walk from one float to the other as I worked my way around the airplane moored to a dock. Not only do you inspect all the things that are part of a land airplane, but also all the things associated with operation on the water. These include the wires that brace the floats, the cables and pulleys that connect the air rudder to the water rudders, and the cables and pulleys that lift the water rudders out of the water. Then, there are the floats. It was a challenge not to fall as I pumped water from each of the 10 float compartments.

Preflight inspection completed, it was time to start the water work. As soon as I cast off, I realized that transitioning from heel brakes to toe brakes would not be a problem—brakes are a non-entity in a seaplane. Once adrift, many things compete for your attention, including wind, current, boats, jet skis, swimmers, logs (some partially submerged), rocks (some of these partially submerged as well), critters, and more.

Next, there are the water rudders. Up or down? I'm told I was not the only transitioning land pilot to forget about raising or lowering the water rudders. (For the record, they need to be down for idle and plow taxi and up for step taxi as well as for takeoff and landing.) If you forget to lower them when on the water, the airplane quickly weathervanes into the wind.

Water Work

The excitement continued as I learned the three different ways to taxi a float plane on the water: idle, plow, and step. Idle taxi was simple enough. With power at idle and water rudders down, it's a fairly simple job to taxi in the direction you wish. If the wind is blowing, however, the water rudders might not have enough force to turn the airplane downwind. That's where plow taxi comes in. Add power to bring the nose up, shifting the center of buoyancy aft so that the wind can help push the nose of the airplane downwind. Apart from the impact on visibility—you can no longer see where you are going—staying in this attitude too long can cause the engine to overheat. Fortunately, it's not a maneuver used too frequently, nor for very long.

The last way to taxi is the step taxi. The maneuver requires adding full power after raising the water rudders. After the nose does its second rise you ease the stick forward and the airplane comes up on the step of the float. If the stick is too far forward, the airplane will start to porpoise. If too far back, it won't get up on the step. Finding the "sweet spot" was not as difficult as I thought it might be, and I was soon planing along on the step.

A Delicate Balance

What a rush. Or, at least it was, until I had to turn. Turning during a step taxi requires a delicate balance. It is a skidding turn. This means that the outside float is pushed down into the water by centrifugal force, which creates significant drag. You can overcome the drag with power or by increasing the radius of the turn. Add too much power and the centrifugal force might cause you to capsize. On the other hand, not enough power means you come off the step. As I said, it's a delicate balance.

There's more to learn on the water, some of it chilling (if not thrilling) especially if you end up in water. Beaching, ramping, docking, mooring, and sailing were all new maneuvers.

Of course, there's the flying to learn as well. I especially enjoyed learning the different takeoffs and landings. These include normal, crosswind, rough water, glassy water, confined area, and landings from a simulated power failure. Particularly cool was being able to turn in the midst of takeoff, raise one float to reduce the drag, and get in the air. I also enjoyed flying traffic patterns rarely higher than 500 feet above the water. But through all this fun, it's important to be vigilant and ensure the takeoff and landing area is free of water traffic that might lead to collision.

Be vigilant and ensure the takeoff and landing area is free of water traffic that could lead to collision.

Adding the ASES rating to my certificate was one of the most enjoyable and refreshing things I've done. If you seek more excitement in your flying, consider this rating. I guarantee that it will add a whole new dimension to your aeronautical experience. I wish you blue seas, blue skies, and tailwinds!

Doug Stewart is the 2004 National CFI of the Year, a Master CFI, and a DPE. He operates DSFI, Inc. (www.dsflight.com), based at the Columbia County Airport (1B1) in Hudson, New York.

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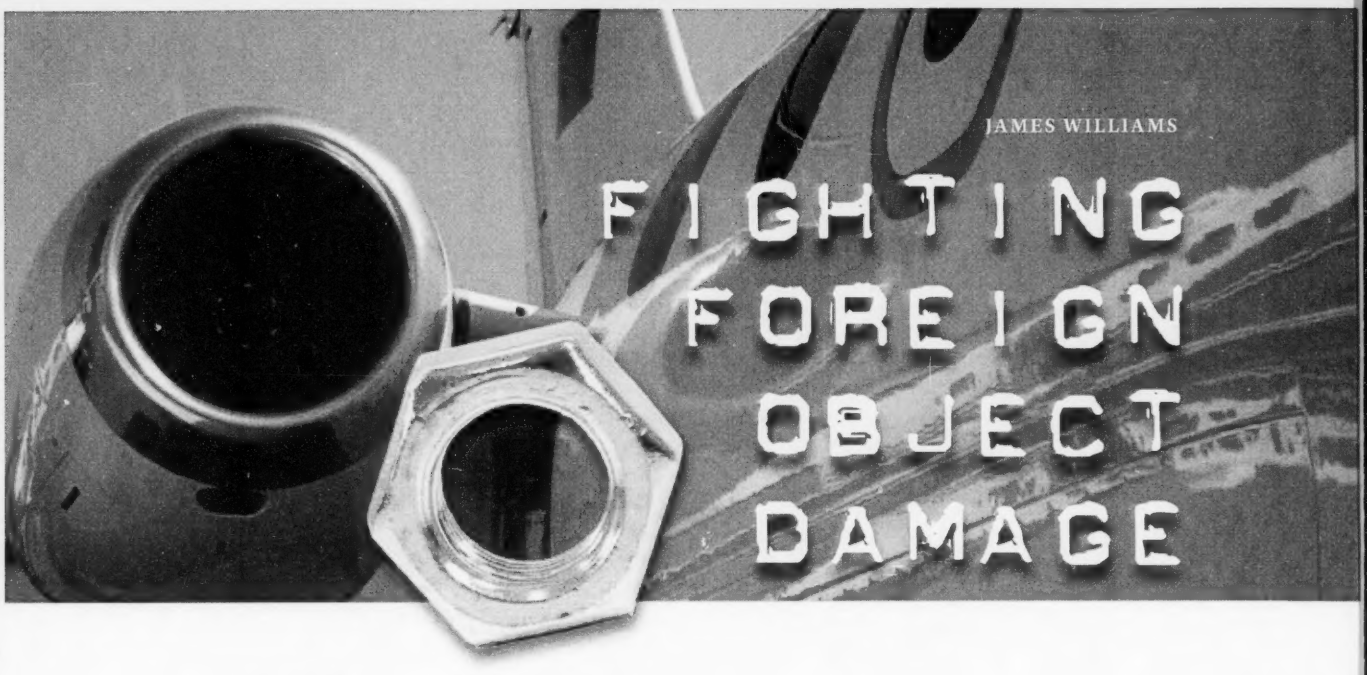
For More Information

Seaplane, Skiplane, and Float/Ski-Equipped Helicopter Operations Handbook
(FAA-H-8083-23)
www.faa.gov/library/manuals/aircraft/seaplane_handbook/media/faa-h08083-23-1.pdf

Advisory Circular 91-69A, Seaplane Safety for 14 CFR Part 91 Operators
http://rgl.faa.gov
Click on Advisory Circulars and type in 91-69A.

H. Dean Chamberlain photo



JAMES WILLIAMS

FIGHTING FOREIGN OBJECT DAMAGE

Whether the cold and gusty winds of winter are still blowing around or the season has turned to the warm and gentle breezes of spring, the possibility of FOD—foreign object damage—is always waiting for you. FOD lurks everywhere, and it can include anything from the chunk of concrete or asphalt pried loose during snow removal or the loose nut rolling around in the empennage. (Note: Although FOD is the acronym for "foreign object damage," the aviation community commonly uses the term as shorthand for debris and other items that can damage aircraft and aircraft components.)

FOD Facts

FOD occurs when something that isn't supposed to be there comes into contact with the aircraft or part of the aircraft. We tend to hear more about FOD in association with jet aircraft, because jet engines are much more vulnerable to FOD incidents. A jet engine is, in essence, a giant vacuum that easily ingests lurking FOD, which can cause catastrophic damage to finely-tuned turbine blades and other components. That's why "FOD walks" to find and remove potentially damaging objects are a standard practice around many military aircraft.

A little bit of extra care and vigilance can save you a lot of trouble from FOD.

Most FOD cases in general aviation involve propeller strikes, which makes sense because the prop is the most active and accessible part of the power train. But FOD can also result in damage to less accessible areas, such as the tight confines of the GA aircraft tail sections. FOD in these areas can damage, weaken, or impede the movement of control mechanisms.

Fighting FOD

The opening of air show season can potentially increase the number of FOD threats. This is because some multi-day events permit pilots to enjoy the camaraderie of camping around their aircraft. Camping brings a wide range of "foreign" objects in close proximity to the aircraft. These can include tent or tie-down stakes, coolers, stoves, lanterns, and other supplies, such as small tools. There are a host of items that could be sucked into your aircraft or lie in wait to jump up at you, particularly if you're parked in tall grass. A little bit of extra vigilance can save you a lot of trouble from FOD. If you do find yourself camping with your airplane this season, consider asking some of your fellow fliers to band together for a FOD walk before anyone starts an engine.

You should also be on the lookout for FOD following maintenance. As described in "Flight Controls, Maintenance, and Fresh Warm Air" (*FAA Aviation News*, May/June 2007), it is possible for tools or hardware used in maintenance to be inadvertently left somewhere in the aircraft. Who hasn't at least once found a tool, rag, or piece of hardware in the car after service? Yes, good maintenance facilities have and use checklists and other FOD-prevention procedures, but mistakes can happen. Look carefully and don't hesitate to question anything that appears not to belong where you see it.

Then there is the issue of what we might call "pilot-induced FOD." Just as we do with our cars, those fortunate enough to own an aircraft often accumulate a wide range of objects in the aircraft. These can include fuel strainers, toolkits, spare parts, and other items that are necessary, but potentially dangerous when they migrate to the wrong part of the airplane. This was the case in the January 2003 crash of a Yakolev *YAK 52* aircraft. The *YAK 52* makes extensive use of pneumatically operated systems for engine start, flap, and landing gear operation. The items carried on board included an air hose to top off the pneumatic systems. Unfortunately, a loose nut from the air hose found its way to the control cables, where it lodged between the elevator bell crank and housing. The object thus limited full elevator travel and resulted in a crash that killed both pilots. The accident report lists probable cause as: "Malfunction of the elevator control as a result of a jammed elevator control bell crank, rendering control of the aircraft impossible."

FOD-Free Flights

Not surprisingly, a thorough preflight is a vital part of keeping your flight free of FOD. Consider, though, that you should also preflight the area around your aircraft, including the tie-down area and the ramp. If you see anything that doesn't belong, be a good aviation citizen and remove it. Double-check the security of equipment both inside and outside the aircraft. Ensuring full freedom of your flight controls is important, too. As always in aviation, a bit of extra effort is well worth the bit of extra time required to ensure safe operation.

James Williams is a technical writer-editor in FAA's General Aviation and Commercial Division. He is also a pilot and ground instructor.

For More Information

***Pilot's Handbook of Aeronautical Knowledge*, Chapter 6**
www.faa.gov/library/manuals/aviation/pilot_handbook/media/PHAK%20-%20Chapter%2006.pdf

NTSB Accident Report DEN03FA034
www.ntsb.gov/ntsb/brief.asp?ev_id=20030124X00102&key=1

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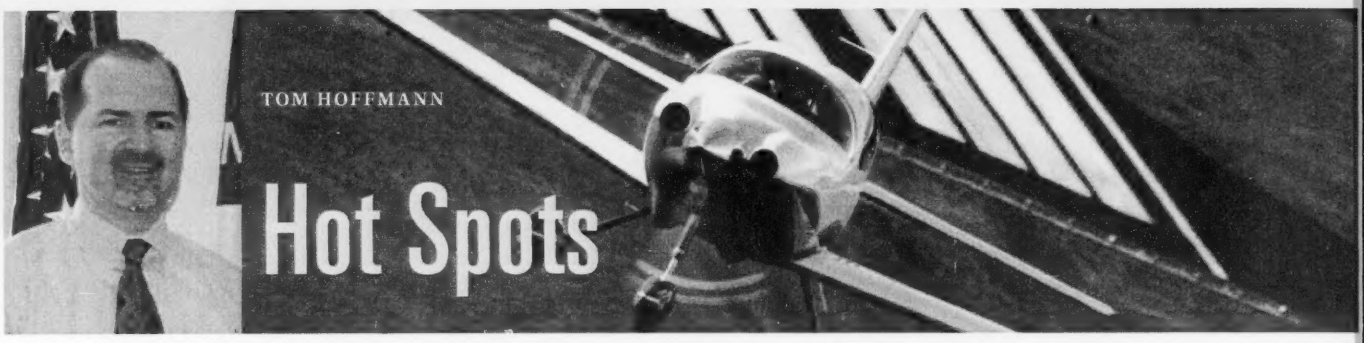

TOM HOFFMANN

Hot Spots

Keep Cool and Safe with TFR Awareness

Springtime brings warmer weather, more daylight, and, for many pilots, renewed interest in taking to the skies. This increased fervor for flight is also great for other outdoor activities, which means that pilots can expect to encounter airspace restrictions arising from outdoor sporting events and air shows. On any given day, there can be dozens of Temporary Flight Restrictions (TFR) in place over the continental United States. As you probably know, a TFR is a special type of *Notice to Airmen* (NOTAM) that defines an area restricted due to a hazardous condition, a special event, or national security. Without proper planning, pilots out for a springtime joyride can easily find themselves in the wrong place at the wrong time.

Proper Planning Prevents Problems

The most common cause of airspace-related pilot deviations is improper preflight planning. Of these, TFR violations are the most frequent and usually result from pilots losing situational awareness or failing to make that one last preflight check for NOTAMs along the planned route.

Regardless of cause, TFR violations can be dangerous for all concerned. Inadvertent flight into a TFR, or even skirting its outer boundaries, can put your certificate at risk. More critically, though, it disrupts air traffic procedures and carries the potential to put you and your fellow airmen at risk of a mid-air collision.

The possibility of interception by law enforcement or military aircraft is another possible consequence. In one recent airspace violation, the pilot was on a 15-minute pleasure flight for the storied hundred-dollar hamburger. On the return leg to a small grass strip, the pilot blundered into a TFR that had just gone into effect. The authorities scrambled an F-16 *Fighting Falcon* to investigate. The pilot landed safely, but learned an important lesson about the importance of checking NOTAMs before every flight.

Beware of Short-Notice TFRs

To the greatest possible extent, the FAA works with those requesting TFRs to provide advance notice to the flying community. For instance, TFRs for sporting events and air shows are typically scheduled 45 days in advance. However, some TFRs can crop up with little warning. These can include flight restrictions imposed due to a hazardous condition, an aircraft incident, or reasons of national security.

Below is an example (adapted from an Aviation Safety Reporting System, or ASRS, report) that can be a lesson for all pilots:

On a mountain sightseeing flight in VFR conditions, I was flying over a lake when I noticed a retractable-gear Cessna along with a large helicopter two miles away scooping up water for what appeared to be a firefighting operation. After realizing the likelihood of being in an active TFR, I quickly reversed direction to leave the area ...However, the Cessna passed over me and to my left by about 200 feet, presumably to record my tail number. After returning, I realized I had indeed deviated into restricted airspace as a result of not having received a proper pre-flight briefing ...We were on an unplanned scenic flight without a clear plan on where the flight would be going. In the future ... I will always receive a preflight briefing, even for local flights. I will also plan all my flights!

A graphical display of TFRs on FAA's Web site

National Security Matters

On the subject of national security, pilots everywhere need to be alert to flight restrictions associated with VIP movement. As Washington, DC-area pilots know all too well, there can also be restrictions related to national defense airspace. For several years now, the airspace around the nation's capital has been known as the DC Air Defense Identification Zone (DC ADIZ) to facilitate the early identification of all aircraft operating within 30 nautical miles of the DCA VOR/DME. On February 17, 2009, the restrictions previously imposed via TFR became permanent with the promulgation of a new regulation. The regulation reclassified this airspace as a Special Flight Rules Area (SFRA).

It is not possible to overstate the importance of knowing, and following, the established rules and procedures for operating in the DC SFRA. Mandatory special awareness training (available online at FAASafety.gov) is designed to ensure that any pilot operating within 60 nautical miles of the DCA VOR/DME is fully briefed on the dimensions, requirements, and procedures for operating VFR in this airspace.

Most violations are completely avoidable. In one DC ADIZ/SFRA case, a pilot departed an airport near the edge of the restricted airspace, navigated for several minutes on his own, entered the ADIZ/SFRA, and only then "turned on the GPS." It was too late.

Since some procedures in the SFRA will continue to be regulated via NOTAM, pilots should continue the practice of checking NOTAMs before every flight. This information is available from a range of sources, including Lockheed Martin Flight Service, direct user access terminal (DUAT or DUATS), and the TFR pages on the FAA's Web site at http://tfr.faa.gov/tfr2/list.html.

Room for Improvement

Thanks to a widespread communication effort, TFR compliance has improved greatly with a 75 percent decline in the number of pilot deviations in fiscal year 2008. To improve compliance even more, the FAA is committed to broadening its communication effort on TFR awareness by working with aviation organizations, such as the Aircraft Owners and Pilots Association and the National Business Aviation Association.

In addition, "We're talking directly to the pilots about these issues," notes ATO Systems Operations Security Manager Tim Wallace. "We're also committed to working more closely within FAA to address TFR issues and be more proactive about communicating changes as they occur."

Appropriate use of technology, such as GPS moving map navigators, can also be a tremendous help in avoiding TFRs. Remember, it's easy to transpose letters or numbers so have a navigation plan loaded and checked before takeoff. A little planning goes a long way toward avoiding problems no pilot wants to encounter!

Pilots everywhere need to be alert to flight restrictions associated with VIP movement.

Tom Hoffmann is associate editor of FAA Aviation News. He is a private pilot and holds an Airframe and Powerplant certificate.

MARTIN BAILEY

Nuts, Bolts, and Electrons

New e337 Form

Documenting Major Repairs with Point and Click

How many of us actually still mail our monthly bills? With the advantages of online banking, it seems inconvenient to go through the process of writing checks, stuffing envelopes, buying stamps, and getting to the nearest mailbox. Many surveys show that a majority of Americans have moved from stamp-licking to mouse-clicking as the preferred way to pay bills.

That logic, and technology, is now being applied to many online processes available for aircraft maintenance. Why make a trip to the Flight Standards District Office (FSDO) when you can provide the same information—and get a faster result—right from your keyboard? Since January 2007, you have been able to do just that, using an electronic version of Form 337 to document major aircraft repairs and alterations.

The online version of the 337 form is easier to use.

Same Form—Only Better

The online form, known as the "e337," has the same look and feel of the paper version, but it is easier to use. A built-in design feature prevents typical errors made on paper forms, such as registration and serial number inconsistencies, blank required fields, and multi-line entries. The system will also not allow you to submit the form until all known discrepancies are corrected.

An automatic electronic tracking number allows easier retrieval and identification of individual forms. The greater accuracy of the e337 brings noticeable improvements in data quality, instantaneous movement through workflow, and data retrieval capability that enhances safety trend monitoring.

"The new form revolutionizes the way we do business with major repairs and alterations," states Aviation Safety Inspector and e337 Project Lead Bob Stockslager. "The e337 improves the overall system, which benefits everyone."

So What Do I Need?

To use the electronic 337 system you need:

- Access to the Internet. (See https://eformservice.faa.gov/eform337.aspx for system

Mario Toscano photo

Bill O'Brien: Friend and Hero

The aviation community lost an icon and a friend on November 9, 2008, when retired FAA National Resource Specialist Bill O'Brien passed away. According to Carol Giles, manager of FAA's Aircraft Maintenance Division, "Bill's efforts provided a never-before-seen awareness of the professionalism and hard work of mechanics worldwide." A leading advocate for the aviation maintenance technician (AMT), O'Brien was widely known for his "no-nonsense" view of mechanic issues in his regular column in *AMT Magazine*.

O'Brien's many contributions to aviation safety included co-founding the AMT Awards Program and creating the advisory circulars on flight testing amateur-built aircraft and for the Charles Taylor "Master Mechanic" Award. In addition, O'Brien's leadership led to educational institutions providing college credits for maintenance experience, allowing many AMTs to return to school and receive a degree. It was this dedication to education, training, and professionalism that made Bill O'Brien so beloved and respected among his peers and fellow mechanics. His contributions will be long remembered.

requirements.)

- A free user account with the FAA, so the agency can identify and validate user credentials. An account can be established for individuals or for organizations with multiple users.
- A digital signature from a third-party contractor (at a minimal cost) in order to sign and process the form through completion.

The eForm service homepage provides user guidance in the form of tutorials, PowerPoint® presentations, help topics, and related reference documents. The "What's New" link will help you make sure you know about any updates or changes. Technical support is available 24/7. There are also two video presentations available at FAASafety.gov. One offers an industry perspective and the second shows a user perspective.

Is the e337 Mandatory?

There are always people who are resistant to change and reluctant to abandon the paper method. That's okay. Use of the e337 is not mandatory, but it is strongly encouraged. Benefits include avoiding the travel to a FSDO to get a quick turnaround for approval. Also, the online submittal is faster, more accurate, and it helps promote safety by providing data for trend analysis. The electronic version of the form helps provide a more streamlined method of recording major repairs or alterations.

The best suggestion, especially for a first-time user, is to spend some time getting familiar with the e-form. Open it and try it out. Once you see how easy and efficient it is to use, you'll never turn back. And, who knows? Your e337 might just help prevent a future incident from occurring.

Be safe, and have fun!

Martin Bailey is manager of Flight Standards Service's Repair Station Branch. Bob Stockslager contributed to the article. He is an aviation safety inspector (airworthiness) with the Flight Standards Service's General Aviation and Avionics Branch and also a project lead on the e337 development team.

For More Information:

Advisory Circular 43.9-1F, *Instructions for Completion of FAA Form 337*
http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/0/b824c64a310b1c8686257272006dff36/$FILE/AC%2043.9-1F.pdf

Aviation Safety e-Form Information
https://eformservice.faa.gov/eForm337.aspx

Calling All Mechanics

Keep Informed with

FAA's Aviation Maintenance Alerts

Aviation Maintenance Alerts (Advisory Circular 43.16A) provide a communication channel to share information on aviation service experiences. Prepared monthly, they are based on information FAA receives from people who operate and maintain civil aeronautical products.

The alerts, which provide notice of conditions reported via a Malfunction or Defect Report or a Service Difficulty Report, help improve aeronautical product durability, reliability, and maintain safety.

Recent alerts cover:

- Control yoke corrosion issues for all Cessna 172/180/185 models
- Cracked main gear actuators on the Cessna 172RG
- Sheared rivets in the horizontal stabilizer pivot fittings on the Beech 400A.

Check out *Aviation Maintenance Alerts* at:
www.faa.gov/aircraft/safety/alerts/aviation_maintenance/

FAAST
Federal Aviation Administration
SAFETY TEAM

Got Safety?

Are you planning a cross-country flight? Do you want to expand your knowledge on maintenance procedures? Are you looking for local safety/TFR information? At www.FAASafety.gov, the FAA Safety Team has a host of safety resources: online learning center, information about safety events and seminars, and much more. Log on today!

www.FAASafety.gov

FEDERAL AVIATION ADMINISTRATION

Flight Forum

Lost in Translation

Thanks for publishing my article, "Heart Attack," in the January/February 2009 issue, but I need to clarify one thing. The MSK was arthritis and not some dread disease.

—Tom Cruse
Dayton, OH

As with every profession, there seems to be a multitude of translations for the same abbreviation. Here at FAA the letters AC can mean aircraft, aeronautical center, or advisory circular. We incorrectly used medullary sponge kidney disease, when MSK should have been translated as "musculoskeletal." We apologize for the error.

Taming the Non-towered Babble

Just finished reading the November/December issue of *Aviation News*. Again you've done a great job. The magazine keeps getting better and better.

Found myself agreeing with Jim Alsip's "Taming the Non-towered Babble." Being based at a non-towered airport, I've become very aware of radio calls that leave something to be desired. There are two things I'd add. When taking off, it's helpful to aircraft in the area to know which direction the departing airplane will be heading or that they're "staying in the pattern." The other addition would be to suggest that landing pilots announce whether they're "touch and go" or "full stop" so others in the pattern can adjust their spacing accordingly.

Keep up the good work!

—Tom Benenson
Columbiaville, NY

Thank you for the kind words and consider your suggestions added.

Clearing the Air

In the November/December 2008 issue, Mr. Ballough makes reference to the "Man in a Van" as an indication of what the previous Aviation Safety Program entailed. This apparently was an impression of what the previous Safety Program may have been in some areas. However, there were many professional safety program managers who constantly strived to educate local pilots on area risks. Many times during this transition period to the FAA Safety Team, or FAASTeam, I have heard this "Man in a Van" description that I think reflects unfairly on a program that was administered by many committed professionals.

—Roger "N" Clark
Principal Inspector (Operations)

Thank you for the opportunity to clarify. It was not intended to disparage the former program or the committed individuals who were a part of it and made valuable safety contributions. We regret that it came across that way.

FAA Aviation News welcomes comments. We may edit letters for style and/or length. If we have more than one letter on the same topic, we will select one representative letter to publish. Because of our publishing schedules, responses may not appear for several issues. We do not print anonymous letters, but we do withhold names or send personal replies upon request. Readers are reminded that questions dealing with immediate FAA operational issues should be referred to their local Flight Standards District Office or Air Traffic facility. Send letters to Editor, FAA Aviation News, *AFS-805, 800 Independence Avenue, SW, Washington, DC 20591, or FAX them to (202) 267-9463, or e-mail them to AviationNews@faa.gov.*

SUSAN PARSON

Editor's Runway

Citizens of the Sky

It wasn't all *that* long ago when I started flying (honest), but there have been many dramatic changes since I earned my first pilot certificate. Just a few years ago, student pilots could choose between the old trainer and the older one... because nobody was manufacturing new general aviation training aircraft. That all changed with the General Aviation Revitalization Act of 1994, which encouraged not only the design of new airframes, but also development of the advanced technologies we have highlighted in this issue. These days, when I see long-time pilots gape in amazement at the airliner-style glass panels that are now standard equipment in new general aviation aircraft, I like to point out that, "It's not your father's 172!"

An attitude of gratitude and respect should be part of the "right stuff" embedded in every pilot's DNA.

Aviation Citizens

The airframes have changed a little. The avionics have changed a lot. What has not changed, though, is the attitude of gratitude and respect that should be part of the much-ballyhooed "right stuff" embedded in every pilot's DNA. Although we all sometimes take flying for granted, I hope that none of us ever flies an aircraft without at least some glimmer of gratitude for the privilege of flight.

The privilege of flight makes us all citizens of the sky, or as Arlynn McMahon, my friend and fellow flight instructor, likes to say, "aviation citizens." Although the term has not yet found broad use, that may change as flight instructors and their students get acquainted with the newly revised *Aviation Instructor's Handbook* (AIH), which this issue's Checklist column describes in more detail. I am happy to report that this latest edition of the AIH specifically introduces the concept of the aviation citizen, and notes that the aviation instructor bears responsibility for "molding an aviation citizen [who] will be an asset to the rest of the aviation community." Among other things, a good aviation citizen will consistently:

Being a good citizen of our shared aviation community is a responsibility that we all share.

- Make safety the number one priority
- Adhere to laws, regulations, and prudent operating practices
- Develop and exercise good judgment in making decisions
- Act with responsibility and courtesy
- Be accountable for his or her actions
- Be respectful of the privilege of flight

Aviation Community

Being a good citizen of our shared aviation community is a responsibility that we all share. As you emerge from the less-active winter-flying season, I hope you will do your part to be a credit to your fellow aviation citizens on every flight. Is your airplane legally airworthy and in a safe condition for flight? Are you qualified and current? (By the way, electronic logbooks—another technological improvement—are great for helping you keep track of key currency dates). Are you proficient in control of the aircraft and its technology, so you can be confident in a wide variety of situations?

If the answer to any of these questions is negative, do whatever it takes to get your "aviation passport" in order for a safe season in the sky.

Safe flights and happy landings.

Susan Parson is a special assistant in Flight Standards Service's General Aviation and Commercial Division. She is an active general aviation pilot and flight instructor.

LYNN MCCLOUD

Imagining the Future

FAA Faces: Terry Stubblefield

"Not too many years from now, I envision many GA pilots will fly small airplanes equipped with glass cockpits and advanced flight vision systems. They will be able to fly practically anywhere, any time, in any visibility."

That might sound like a grand "stretch" goal, but from where Terry Stubblefield sits in the FAA's Flight Technologies and Procedures Division such a scenario is not that far in the future. A pilot and engineering psychologist, Stubblefield works in the division's Flight Operations Branch.

"I get paid for doing what I love—helping introduce new technologies into the National Airspace System," Stubblefield says. Current assignments include developing policy for enhanced and synthetic vision systems, writing corresponding operations specifications and guidance materials, formulating a proof-of-concept for using enhanced flight vision systems in lieu of centerline lights for low-visibility takeoffs, among other assignments. Also, she participates in an FAA/industry special committee charged with drafting the minimum aviation system performance standards for enhanced flight vision systems, synthetic vision systems, and advanced vision systems.

Among her most gratifying FAA tasks, she reports, is the work with enhanced flight vision systems. It involves new technology and "allows me to combine my background as a pilot with my training in cognitive science and human factors."

Growing up in Clarkston, Washington, Stubblefield recalls the excitement of watching airplanes taking off and landing at the Spokane International Airport and watching jets on final approach to Fairchild Air Force Base as they flew over her grandfather's farm near Spokane. As a 12-year-old, she discovered her uncle's Navy flight training manuals tucked away in a closet and spent a summer memorizing every part of an airplane.

Heading off to college, she pursued a degree in nursing, but short of graduating, Stubblefield put both nursing and aviation on a back burner to go to Nicaragua to work with disadvantaged youth. On her return to the United States, Stubblefield pursued flight training at Miami's Kendall-Tamiami Executive Airport. Hooked on flying, she earned commercial pilot and flight instructor certificates with single engine, multi-engine, and instrument ratings on both certificates.

Stints as a flight instructor at several Miami flight training centers followed and Stubblefield realized that aviation was to be her career. The next stop was Embry-Riddle Aeronautical University where she earned a bachelor's degree in aeronautics and minored in aviation safety. As a flight instructor, she had developed an interest in human factors and that led her to George Mason University in Northern Virginia where she received a master's degree in human factors and applied cognition.

Stubblefield's FAA entry point was a position in the Office of Rulemaking, but she quickly moved to the Flight Technologies and Procedures Division where she could apply her training to specific technologies. "This is where I belong," she says. "Aviation's future is providing more capability in the cockpit so that equivalent visual operations are possible no matter how low the visibility conditions. This is the part of the FAA that is leading the way."

Imagine being able to land at night in the fog at a non-towered field with one 6,730-foot runway, such as Pullman-Moscow Regional Airport in Eastern Washington. Stubblefield was at that airport a few months ago when dense fog resulted in a missed approach. "I couldn't help thinking we could have gotten in if we'd had an enhanced flight vision system on board."

Imagine that, indeed!

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